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1. Title of the Invention

Adaptable device for delimiting and organizing spaces and volumes.

2. Technical Area to Which the Invention Relates

The device according to the invention is designed, nonexclusively, to construct fair and exhibition stalls or to construct partial or complete study models representing organized or unorganized architectural spaces.

3. Prior Art

Usually, fair and exhibition stalls, architectural or interior decoration models are of fixed dimensions and apply to a single project. Thus, the large variety of shapes and dimensions of the rooms or the areas to be organized rarely permits reusing the elements representing the walls, a situation which requires their fabrication at the required length. This entails expenses associated with the use of raw materials and with the time spent in the fabrication of the walls, expenses which are not always recouped by the outcome of the project. As regards fair and exhibition stalls, the areas and the shapes of the spaces allocated to an exhibitor vary enough to necessitate custom fabrication. Certain systems claim to be adaptable to the actual dimensions while using standardized, juxtaposable elements of fixed dimensions. However, the variety of constructions and areas necessitates having a large number of different elements, a situation which negatively affects the ease of construction, stability, and rigidity.

Despite a large number of different elements, it is necessary to make an approximation concerning the length of the walls, a situation which negatively affects the study of the space occupied and the evolutionary zones or the optimum use of the area to be organized.

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Moreover, the organization and decoration of these spaces is often nonexistent or stylized, i.e., simplified or standardized, for obvious economic reasons, without leaving the user the possibility of adaptation to individual needs.

4. Technical Problem To Be Resolved

The present invention remedies these disadvantages by proposing a device for delimiting and organizing spaces and volumes, which is evolutionary, reusable, adaptable to the dimensions of an existing architectural space, modifiable without accessories, and easily and rapidly decorated by the user.

5. Glossary

Throughout the following, we will adopt the convention of using the term **space element** for an element which enables delimiting a space representing, by way of example and nonrestrictively, in reduced scale or not, a wall, a low wall, a portion or all of a floor, a portion of a ceiling; of using the term **decorative object** for an object representing, by way of example and nonrestrictively, in reduced scale or not, furniture, architectural or decorative elements, such as a door, a window, a plumbing fixture, a technical conduit, a power outlet, a person; of using the term **coupling** for a link designed to connect two space elements temporarily or definitively. We will also adopt the convention of using the adjective **magnetic** to indicate the presence of ferromagnetic properties intrinsic to or added to the element described and of using the adjective **magnetized** to indicate the presence of magnetic fields intrinsic to or added to the element described.

6. Description of the Invention

The present invention concerns an evolutionary, reusable device to partially or completely create a volume by means of basic forms with variable or invariable dimensions, connected

by couplings and decorated by decorative objects. These basic forms are, by way of example and nonrestrictively, portions of planes, portions of volumes with a simple or complex geometric shape, with said basic forms capable of being decorated.

This device is constituted of, depending on its final use, at least one of the following elements, the list of which is provided by way of example and nonlimitingly, with neither restriction or limitation with regard to their quantities or their qualities:

- a support plane, which may be magnetic, which may be foldable, and which may be composed of space elements,
- space elements, of any shape whatsoever, which may be magnetic, with variable dimensions, connected to each other in a manner which may be temporary by means of at least one coupling,
- decorative elements scaled to the space elements, of which the decoration may be removable, which can be positioned on the space elements by means of a link,
- fastening accessories which may be articulated, which may be magnetized, such as corner braces, removable articulated connectors...

In the following, to improve the clarity of the description of the invention, reference will be made to the annexed drawings.

6.1 Description of the Support Plane

The support plane enables maintaining the space elements in their relative positions. The support plane may be constituted of one or a plurality of space elements, connected by fixed or removable couplings, which are disassemblable or nondisassemblable. The support plane holds the space elements in place by simple contact friction, or by means of a fastening accessory.

6.2 Description of a Space Element

A space element defines a flat area or a portion of volume. In general, a space element is made up of at least one part equipped with at least one fastening portion. More precisely, a variable-dimension space element is made up of at least two parts (Figure 1), a male part (1) and a female part (2), which slip one into the other. The female part and the male part are composed of one or a plurality of permanently assembled parts. The male part and the female part of a space element may have ferromagnetic properties, which are intrinsic or which have been added over all or part of their surface. To facilitate the length adjustment of a space element, the male part is graduated (3). The length represented is read directly from the intersection of the graduated scale with the edge of the female part in contact with the male part.

To facilitate the reading of the length of a space element, a notch (4) is made in the female part, at the level of the graduated scale on the male part. At the minimum length, the male part abuts the female part, yielding the minimum dimension that the space element can delimit.

The length of the space element can be maintained by means of a blocking system, for instance, a locking wedge, activated or added after the length is set.

6.3 Description of the Coupling

The coupling which enables connecting two space elements is ideally designed to connect at least two space element parts to each other while still enabling said parts to pivot relative to each other on an axis parallel to the edges of the parts in contact and permitting the intersection of space element assemblies. More precisely, the coupling comprises at least one segment and is composed of at least one part called a portion. The coupling is present on at least one space element part. The coupling connects either the female parts (Figure 2 Item 5 or Figure 3 Item 8) or the male parts (Figure 2 Item 6 or Figure 3 Item 7) of two space

elements, or the male part of a space element to the female part of another space element (Item 9 of Figure 4 and 6 or Figure 5 Item 10). Each space element part has, depending on the mode of fabrication of the coupling, at least one coupling portion on at least one of its edges (Figure 8). The arrangement of these coupling portions enables construction of adjacent spaces (Figure 6 and 7), even when the intersection of the space elements does not form a right angle.

Throughout the following, we adopt the convention of using the term **fixed coupling** for a disassemblable or permanent coupling which cannot be easily separated from a space element; of using the term **removable coupling** for a disassemblable or permanent coupling which can be easily separated from a space element; of using the term **disassemblable coupling** for a fixed or removable coupling whose component parts can be easily separated; and of using the term **permanent coupling** for a fixed or removable coupling whose component parts cannot be easily separated.

In general, a fixed or removable coupling which connects two space elements can be permanent or disassemblable.

6.3.1 Description of a Permanent Coupling

When the fixing of the coupling is permanent, the device comprises space element parts connected to each other by a coupling as well as independent space element parts with at least one coupling (Figure 6 Item 11 and 12). This coupling occupies approximately one-half the height of the space element in order to permit the intersection of space elements, a situation which allows construction of adjacent spaces (Figure 6).

6.3.2 Description of a Disassemblable Coupling

The solution with a disassemblable coupling is best. In fact, if the coupling is disassemblable, a single type of space element having at least one portion of a coupling on at least one of its ends suffices. The use of a disassemblable link also enables facilitating the organization and visualization of spaces with small dimensions. Thus, once one link is disassembled, it is possible to pivot the space elements which remain connected to spread them apart, a situation which increases accessibility for placement of the decorative objects.

The segments of a disassemblable coupling of an intersected group of space elements (Figure 8 Item 15 & 17) are located high and low on the adjacent edges of the space elements. The coupling of an intersecting group of space elements (Figure 8 Item 14 & 16) is located at the center of the adjacent edges of the space elements. The distance between the high and low segments of a coupling of an intersected group of space elements is such that it enables the passage of the central coupling of an intersecting group of space elements. Ideally designed, the coupling of the intersected group of space elements and the coupling of the intersecting group of space elements integrates the space elements while still leaving them free to pivot relative to each other.

6.4 The Decorative Objects

The decorative objects include, nonrestrictively, persons, furniture placed on the floor or hanging on the wall, windows and doors of different formats, stairs, cooktops, work surfaces, and any object that may be part of the decoration of a space or which enables providing more realism for a model or a fair or exhibition stall, as well as accesses to technical conduits, power outlets, gas and water connections...

A decorative object is positioned on a space element (Figure 9 Item 20) by means of a link which may be either sliding (Figure 9 Item 18) relative to the decorative object (Figure 9 Item 19) or magnetized. A magnetized decorative object (Figure 10 Item 23) has at least one magnetized system (Figure 10 Item 21) generating a magnetic force adequately weak relative

to human muscle power or whose magnetism can be deactivated by the user. When a magnetized decorative object is placed in contact with a magnetic space element (Figure 10 Item 22), the magnetic force generated is adequate to maintain the relative position of the decorative object in relationship to the space element.

A decorative object can be produced starting from any material whatsoever or a combination of materials, for example, plastic, metal, mineral, or cellulose, which can be molded, folded, assembled, or shaped by any other process.

6.5 Removable Decoration Supports

6.5.1 The Case of Front Faces

In order to leave the user the possibility of adapting the decorative objects to his or her needs, certain decorative objects may receive a fixed or removable decoration support made of a transparent material, which can be decorated. In the illustration (Figure 11) presented by way of example, the decoration support (25) slips onto the front face of the decorative object (24). Thus, the user may insert a decorated design (26) on an element, a situation which makes it possible to avoid the need to have a plurality of decorative objects for different decorations.

6.5.2 The Case of Decorated Jackets

The decorative objects may also be completely or partially covered by a decoration support. The decoration may be, by way of example and nonrestrictively, applied by printing before or after being formed into a jacket. This jacket, adapted to the shape of the decorative object for which it is intended, is applied thereon so as to completely or partially cover it. In the illustration (Figure 12) presented by way of example, the decoration support (28) slips over the decorative object (27). Thus, the user may insert a decorated design between the decorative object and the decorative jacket, or change jackets if the jacket itself is decorated,

a situation which makes it possible to avoid the need to have a plurality of decorative objects for different decorations.

6.6 Description of the Mounting Accessories

Different mounting accessories are used such as, by way of example and nonrestrictively, fixed or articulated squares, which may be magnetized, to hold the space elements in their relative position.

7. Use and Usefulness of the Invention

The invention is applicable to numerous sectors of activity; by way of example and nonrestrictively, it is possible to mention the construction of fair and exhibition stalls and the construction of models for interior organization projects. The elements of the model may exactly represent the elements used for the construction of a stall, put to scale.

8. Description of the Annexed Drawings

The annexed drawings represent, by way of nonrestrictive examples, some embodiments of the device according to the invention.

Figure 1 is a front view of a space element.

Figure 2 schematically depicts a top view of a closed space delimited by space elements composed of female parts connected to each other by a permanent coupling and male parts connected to each other by a permanent coupling.

Figure 3 schematically depicts a top view of a closed space delimited by space elements composed of female parts connected to each other by a disassemblable coupling and male parts connected to each other by a disassemblable coupling.

Figure 4 schematically depicts a top view of a space delimited by space elements of which the male element is connected to the female element by a permanent coupling.

Figure 5 schematically depicts a top view of a space delimited by space elements of which the male part is connected to the female part by a disassemblable coupling.

Figure 6 schematically depicts a top view of a closed space with adjacent planes delimited by space elements composed of a female part and a male part connected by a permanent fixed coupling (9), and by individual male (12) and female (11) parts having a fixed, permanent coupling.

Figure 7 schematically depicts a top view of a closed space with adjacent planes delimited by space elements (13) connected by disassemblable couplings.

Figure 8 is an exploded perspective view of an intersecting group of space elements (14 & 16) and of an intersected group of space elements (15 & 17) constituting an intersection. The coupling depicted is of a disassemblable type.

Figure 9 is a perspective depiction of a decorative object (19) positioned by a strip (18) sliding on a schematically depicted space element (20). The horizontal arrows represent the relative movement of the sliding strip in relationship to the space element; the vertical arrow represents the relative movement of the decorative object in relationship to the sliding strip.

Figure 10 is a perspective depiction of a magnetized decorative object (23) positioned on a schematically depicted space element (22). The arrows represent the relative movements of the decorative object in relationship to the space element.

Figure 11 is an exploded perspective view of a decorative object (24) on which a decoration support (25) and a decorated design (26) are applied.

Figure 12 is an exploded perspective view of a decorative object (27) on which a decoration support (28) is applied.

Figure 13 is an enlarged detailed view of a peeled space element showing how, by the affixing of a metal sheet (31), magnetic properties are added to a space element made of a nonmagnetic material (29).

Figure 14 is a perspective view of the different portions, male (33) and female (32), which make up a coupling with a cyclic profile.

Figure 15 depicts an example of use of the device to study the organization of a kitchen. The device is depicted in perspective, viewed from above.

It should be pointed out that in these drawings, the dimension and the proportions are not systematically respected; this is done to facilitate comprehension.

9. Exemplary Embodiment

The exemplary embodiment described concerns the use of the device, by way of example and nonrestrictively, to create models of interior design projects by means of magnetic space elements connected by a fixed, disassemblable coupling and organized by means of magnetized decorative objects.

A different use of the device such as the creation of stalls intended for fairs and exhibitions would result in a different embodiment complying with the characteristics of the invention. The embodiment is described hereinafter as a nonrestrictive example with reference to the annexed drawings.

9.1 Fabrication of a Space Element

The space elements permit, by way of example and nonrestrictively, representation on a reduced scale of walls with the following dimensions:

- Wall with a length between 1 m and 1.45 m.
- Wall with a length between 1.45 m and 2.45 m.
- Wall with a length between 2.45 m and 4.4 m.
- Wall with a length between 3 m and 5.7 m.

These walls with, by way of example and nonrestrictively, a height of 2.70 m enable representation of a large variety of shapes and dimensions of rooms.

As depicted in Figure 1, a space element is composed of two parts, the male part and the female part.

The male part is fabricated, by way of example and nonrestrictively, starting with a rectangle with low thickness, made of 2-mm cardboard or pasteboard. This rectangle is defined by a height and a length.

The female part is fabricated by assembly of three elements: the base, the body, and the face.

- The base is fabricated, by way of example and nonrestrictively, starting with a rectangle made of cardboard or pasteboard of the same thickness as the male part but with a low length, by way of example and nonrestrictively, a length of 1 cm.

- The body is fabricated, by way of example and nonrestrictively, starting from an evolute in a rectangular shape with low thickness, by way of example and nonrestrictively, 0.5 mm. The height of this rectangle is equal, by way of example and nonrestrictively, to the perimeter of the base section. This rectangle is folded and assembled, by way of example and nonrestrictively, by gluing around the height of the base.
- The face is fabricated starting with a sheet with the final dimensions of the female part, with low thickness and glued to the edge of the junction of the edges of the body.

The dimensions of the internal opening with a rectangular cross-section obtained are such that the male part slips with friction into the female part.

9.2 Addition of Magnetic Properties to a Space Element

Magnetic properties are added to space elements made of nonmagnetic materials such as cellulosic materials (paper, cardboard, pasteboard, wood...) or plastic or composite materials by means of the following structure:

A thin sheet (31) having ferromagnetic properties is fixed between the body of the space element (29) and a nonmagnetic sheet (30). The unit is assembled, by way of example and nonrestrictively, by applying a permanent adhesive on the two faces of the thin sheet having ferromagnetic properties. The operation is repeated for each face that it is necessary to render magnetic. The thin sheet having ferromagnetic properties may be solid or perforated (of a grid, expanded metal, or other type). The nonmagnetic sheet (30) may be replaced by a coat of varnish, paint, plastic material, or any other material capable of being applied to a surface.

The choice of the thickness of the nonmagnetic sheet permits adjustment of the force required to hold the magnetized decorative object when it is applied to the space element.

9.3 Fabrication of a Disassemblable Coupling by Means of a Cyclic Profile

A disassemblable coupling segment (Figure 14) is made up of three parts: the male profile (33), the female profile (32), and a pin (34). A profile is produced starting from a strip perforated along its axis by holes spaced at a constant interval, folded on its longitudinal axis with a radius equal to at least half the thickness of the space element part for which it is intended. Once folded, the profile has notches. The material used may be, by way of example and nonrestrictively, a metal, plastic, cellulosic material, or a woven material used alone or combined with other materials.

Each space element has two types of coupling portion at its ends: at least one male cyclic profile and at least one female cyclic profile. The male cyclic profile differs from the female cyclic profile by an offset of one interval of the notches which constitute it. To connect two space elements, it suffices to place the male cyclic profile in the notches of the female cyclic profile and to introduce a pin into the internal opening of the coupling thus constituted. The pin has a gripping zone added or implemented by construction.

Each cyclic profile is fixed, by gluing or by any other fixation means, on a part of a space element or is included in the evolute of a part of the space element.

9.4 Fabrication of a Decorative Element

The decorative objects are fabricated, by way of example and nonexclusively, of pasteboard with a thickness sufficient to provide some level of rigidity while permitting their manipulation. A decorative object may be obtained, by way of example and nonrestrictively, starting from a plane surface, also called an evolute, folded so as to obtain a volume representing a decorative object on the scale of the space elements. Designs that define the appearance of the decorative element are printed on the different faces of the volume. If

necessary, the evolute of a decorative object is skillfully designed in order to enable, after folding, the placement of a decoration support and a possible sliding strip.

9.5 Fabrication of a Magnetized System for the Decorative Objects

The magnetized link (Figure 10 Item 21) enabling positioning of a decorative object on a space element is composed, by way of example and nonrestrictively, of at least one thin permanent magnetic fixed on one or a plurality of faces of the decorative element. The permanent magnet may be produced in the form of a magnetized sheet having magnetic fields of alternating polarity, which generates a weak magnetic force to permit displacement of the decorative object, but sufficient to support the weight of the decorative object on a space element having magnetic properties.

9.6 Fabrication of a Sliding Strip

If the use of a magnetized link is not appropriate, the decorative item will be positioned by means of at least one sliding strip (Figure 9 Item 18) made of a transparent plastic material. The width of the strip is equal to the length of the recess skillfully made in the decorative object (19), such that the strip is slightly wedged in order to hold the decorative object and prevent its falling under the action of gravity. One end of the strip is in the shape of a hook in order to hang the unit on a space element (20).

9.7 Fabrication of a Decoration Support

The fabrication of the decoration support varies depending on the decorative object to which it is applied. A decoration support may, by way of example and nonrestrictively, be implemented in a strip of folded transparent plastic material (Figure 11 Item 25) such that, once folded, it slides onto the forward face of a decorative element (Figure 11 Item 24).

In the illustration (Figure 12), the decoration support (28) produced by shaping a sheet of plastic material covers a part of the faces constituting the decorative object (27).

10. Advantages Obtained by the Invention

The invention enables designing and constructing arrangements within the framework of the organization of architectural spaces or fair or exhibition stalls starting with predefined space elements, with variable dimensions, combinable among themselves, on which it is possible to apply decorative objects whose decoration can be modified in a simple manner. All these elements are reusable, a situation which reduces the cost of their production and use.

Used within the framework of constructing models for interior design projects, the invention does away with the rigidity and the difficulty of reading drawings such as Figure 15 which depicts a kitchen arrangement and entails several optical illusions which interfere with the comprehension thereof, even though the perspective and the general proportions are respected.

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